AMENDMENTS TO THE CLAIMS

1. (Five Times Amended) A method for making a cell-matrix construct [for use as] in the shape of a heart valve or heart valve leaflet [or blood vessel] comprising

implanting into an animal [at a first site] a cell-matrix construct comprising

(a) a fibrous matrix in the shape of a heart valve or heart value leaflet, wherein the matrix [formed] consists of a synthetic, biocompatible, chemically biodegradable polymer, and

(b) [having seeded therein a mixture of] cells selected from the group [selected from] consisting of endothelial cells, myofibroblasts, skeletal muscle cells, vascular smooth muscle cells, myocytes, fibromyoblasts, and ectodermal cells, seeded thereon,

wherein the synthetic chemically biodegradable polymer provides the biomechanical properties of a heart valve or leaflet until the seeded cells can lay down their own extracellular matrix, and

the matrix is formed so that the cells attach to and proliferate on it to the edges of the matrix [matrix is formed of a biocompatible, biodegradable polymer, and implanting into an animal or human the matrix at a site where the resulting cell-construct is needed.]

2. (Twice Amended) The method of claim 1 [further comprising seeding] wherein the matrix is seeded with dissociated [parenchymal or] connective tissue cells.

3. (Amended) The method of claim 1 wherein the matrix is first cultured at a first site in a patient prior to being [implanted at] transplanted to a second site.

4. (Amended) The method of claim 1 wherein the matrix is in the form of a heart valve

leaflet [and is implanted in the heart].

5. (Twice Amended) The method of claim 1 wherein the cell-matrix construct is seeded with vascular smooth muscle cells and endothelial cells and [is] implanted to form a heart valve.

6. Cancelled.

7. Cancelled.

8. Cancelled.

9. (Amended) The method of claim 1 wherein the cell-matrix construct is formed of a polymer selected from the group consisting of poly(lactide) (PLA), poly(glycolic acid) (PGA), poly(lactide-co-glycolide) (PLGA), poly(caprolactone), polyanhydrides, polyamino acids, and polyortho esters.

10. Cancelled.

11. (New) The method of claim 1 wherein the cell-matrix construct contains interconnected pores in the range of between approximately 100 and 300 microns.

12. (New) The method of claim 1 wherein the cell-matrix construct includes growth factors.

13. (New) The method of claim 12 wherein the growth factors are selected from the group consisting of heparin binding growth factor (hbgf), transforming growth factor alpha or beta (TGFβ), alpha fibroblastic growth factor (FGF), epidermal growth factor (TGF), vascular endothelium growth factor (VEGF), insulin, glucagon, estrogen, nerve growth factor (NGF) and muscle morphogenic factor (MMP).

14. (New) The method of claim 1 wherein the cell-matrix further comprises bioactive factors incorporated to between one and 30% by weight.

15. Cancelled.

18. (New) The method of claim 1 wherein the cell-matrix is first cultured in a bioreactor to form a fibrous tissue-polymeric construct before implantation.

19. (New) The method of claim 18 wherein the bioreactor is an animal.

20. (New) A method for making a cell-matrix construct for implantation comprising implanting into an animal at a first site a fibrous matrix formed of a synthetic biodegradable polymer having seeded therein a mixture of cells selected from the group consisting of endothelial cells, myofibroblasts, skeletal muscle cells, vascular smooth muscle cells, myocytes, fibromyoblasts, and ectodermal cells, wherein the matrix incorporates one or more struts or support members,

Culturing the cell-matrix construct to form tissue, and

Implanting into a second second site in an animal or human the cultured cell-matrix construct.